

AMENDMENTS TO THE CLAIMS

Please cancel Claims 13, 14 and 26-38; amend Claims 1, 3-5, 7, 9, 10 and 20; and add new Claim 39 as follows.

LISTING OF CLAIMS

1. (currently amended) A heat exchanger for performing heat exchange between an external fluid flowing outside thereof and an internal fluid flowing therein, comprising:

~~a core portion including a plurality of tubes arranged in at least one row, the tubes defining first passages through which the internal fluid flows and second passages through which the internal fluid flows after passed through the first passages;~~

~~an introducing portion through which the internal fluid is introduced, the introducing portion connected to the core portion to make communication with the first passages;~~

~~a discharging portion through which the internal fluid is discharged, the discharging portion connected to the core portion to make communication with the second passages;~~

~~a collecting portion connected to the core portion, the collecting portion forming a first space communicating with the first passages in a first section of the core portion and a second space communicating with the first passages in a second section of the core portion; and~~

~~a distributing portion connected to the core portion, the distributing portion forming a first space communicating with the second passages in the first section of the~~

~~core portion and a second space communicating with the second passages in the second section of the core portion,~~

~~wherein the distributing portion communicates with the collecting portion through a communication part having a first communicating portion and a second communicating portion, the first communicating portion is disposed to allow communication between the first space of the collecting portion and the second space of the distributing portion, and the second communicating portion is disposed to allow communication between the second space of the collecting portion and the first space of the distributing portion~~

a core portion having a first core section and a second core section, the first core section and the second core section being disposed in a core width direction that is substantially perpendicular to a flow direction of the external fluid, the core portion including a plurality of tubes arranged in at least one row in the core width direction, the tubes defining first passages in the first and second core sections and second passages in the first and second core sections, one of the first passages and the second passages being disposed upstream of the other with respect to the flow direction of the external fluid;

an introducing portion connected to a first end of the core portion and in communication with the first passages for introducing the internal fluid in the first passages;

a discharging portion connected to the first end of the core portion and in communication with the second passages for discharging the internal fluid from the second passages;

a collecting portion connected to a second end of the core portion, the collecting portion including a first collecting space and a second collecting space, the first collecting space is in communication with the first passages of the first core section and the second collecting space is in communication with the first passages of the second core section;

a distributing portion connected to the second end of the core portion, the distributing portion including a first distributing space and a second distributing space, the first distributing space is in communication with the second passages of the first core section, and the second distributing space is in communication with the second passages of the second core section; and

a communicating part including a first communicating portion and a second communicating portion, wherein

the first communicating portion is disposed to allow communication between the first collecting space and the second distributing space, and

the second communicating portion is disposed to allow communication between the second collecting space and the first distributing space.

2. (original) The heat exchanger according to claim 1, wherein

the tubes are arranged in two rows, the first passages are formed in a first row of tubes and the second passages are formed in a second row of tubes,

the first communicating portion and the second communicating portion are disposed to cross each other, thereby to provide an intersectional part.

3. (currently amended) The heat exchanger according to claim 2, wherein the collecting portion and the distributing portion are provided by tank portions, one of the tank portions is arranged downstream of the other with respect to a flow direction of the external fluid, and

the tank portions are divided at middle positions thereof and, the ~~intersectional~~ communicating part is disposed at the middle positions of the tank portions.

4. (withdrawn; currently amended) The heat exchanger according to claim 2, wherein

the collecting portion and the distributing portion are provided by tank portions, one of the tank portions is arranged downstream of the other with respect to a flow direction of the external fluid, and

the ~~intersectional~~ communicating part is provided outside of the tank portions.

5. (withdrawn; currently amended) The heat exchanger according to claim 2, wherein

the collecting portion and the distributing portion are provided by tank portions, one of the tank portions is arranged downstream of the other with respect to a flow direction of the external fluid,

the ~~communication~~ communicating part is provided by a connecting tank member arranged between the tank portions,

the connecting tank member is divided into a first space and a second space, the first communicating portion is provided by the first space, and the second communicating portion is provided by the second space.

6. (withdrawn) The heat exchanger according to claim 1, wherein
the tubes are arranged in two rows, the first passages are formed by a first row of tubes and the second passages are formed by a second row of tubes,
the distributing portion forms a first tank portion defining the first space and a second tank portion defining the second space, and
one of the first and second tank portions is arranged upstream of the other with respect to a flow direction of the external fluid.

7. (withdrawn; currently amended) The heat exchanger according to claim 6, wherein
the collecting portion is divided into the first collecting space and the second collecting space by a separator,
the first communicating portion is provided at an end of the collecting portion to allow communication between the first collecting space of the collecting portion and the second tank portion, and
the second communicating portion is provided at an opposite end of the collecting portion to allow communication between the second collecting space of the collecting portion and the first tank portion.

8. (withdrawn) The heat exchanger according to claim 6, wherein the collecting portion is provided downstream of the first and second tank portions with respect to the flow direction of the external fluid.

9. (withdrawn; currently amended) The heat exchanger according to claim 1, wherein

the tubs are arranged in two rows, the first passages are formed in a first row of tubes and the second passages are formed in a second row of tubes,

the collecting portion forms a first tank portion defining the first collecting space and a second tank portion defining the second collecting space, and

one of the first and second tank portions is arranged upstream of the other with respect to a flow direction of the external fluid.

10. (withdrawn; currently amended) The heat exchanger according to claim 9, wherein

the first communicating portion is provided at an end of the distributing portion to allow communication between the second tank portion and the first distributing space of the distributing portion, and

the second communicating portion is provided at an opposite end of the distributing portion to allow communication between the first tank portion and the second distributing space of the distributing portion.

11. (withdrawn) The heat exchanger according to claim 9, wherein the distributing portion is provided upstream of the first and second tank portions with respect to the flow direction of the external fluid.

12. (withdrawn) The heat exchanger according to claim 1, wherein
each of the tubes has a flat tube cross-section and defines a plurality of passage spaces therein, and
the first passages and the second passages are defined by the passage spaces in the tube.

13.-14. (cancelled)

15. (withdrawn) The heat exchanger according to claim 1, wherein the core portion is arranged such that the tubes are layered in a vertical direction.

16. (withdrawn) The heat exchanger according to claim 1, further comprising a plurality of inlets through which the internal fluid is introduced in the introducing portion.

17. (withdrawn) The heat exchanger according to claim 1, wherein the core portion forms a multi-flow-type core in which the tubes are arranged such that the internal fluid flows in the plurality of tubes at the same time.

18. (withdrawn) The heat exchanger according to claim 1, wherein the tubes are in forms of serpentine and the core portion forms a multiple-pass, serpentine-type core.

19. (withdrawn) The heat exchanger according to claim 1, wherein the introducing portion, discharging portion, collecting portion and distributing portion are provided by tank portions.

20. (withdrawn; currently amended) The heat exchanger according to claim 19, wherein each of the tank portion portions is formed of a tank plate forming a groove and a communication plate forming communication holes, and the communication plate is joined to the tank plate.

21. (original) The heat exchanger according to claim 1, wherein the core portion is disposed such that the internal fluid flows in the first passages in an upward direction.

22. (original) The heat exchanger according to claim 1, wherein the internal fluid is refrigerant.

23. (withdrawn) A method of using the heat exchanger according to claim 22 in combination with an internal heat exchanger performing heat exchange between a high temperature refrigerant and a low temperature refrigerant.

24. (withdrawn) The method according to claim 23, wherein the heat exchanger is used further in combination with an ejector.

25. (withdrawn) A method of using the heat exchanger according to claim 22 in a refrigerant cycle in which a gas-liquid separator is arranged upstream of one of a pressure-reducing device and the heat exchanger.

26.-38. (cancelled)

39. (new) The heat exchanger according to claim 1, wherein:
the first collecting space and the second collecting space are disposed in the core width direction; and
the first distributing space and the second distributing space are disposed in the core width direction.